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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/043,736   | 01/09/2002  | Andrew Yeoh          | 042390.P10048D      | 7389             |
| 7590 03/05/2004  |             |                      | EXAMINER            |                  |
| Michael A. Bernadicou<br>BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP<br>Seventh Floor<br>12400 Wilshire Boulevard<br>Los Angeles, CA 90025-1026 |             |                      | VU, HUNG K          |                  |
|  |             |                      | ART UNIT            | PAPER NUMBER     |
|  |             |                      | 2811                |                  |

DATE MAILED: 03/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                                      |                                     |  |
|------------------------------|--------------------------------------|-------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/043,736 | <b>Applicant(s)</b><br>YEOH, ANDREW |  |
|                              | <b>Examiner</b><br>Hung K. Vu        | <b>Art Unit</b><br>2811             |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 December 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 18-29 is/are pending in the application.
- 4a) Of the above claim(s) 22 and 29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 18-21 and 23-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>08/11/03</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election of Invention of Embodiment 2 of Figure 3B in Paper No. 12/03/03 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Applicant's election without traverse of Invention of Embodiment 2 of Figure 3B in Paper No. 12/03/03 is acknowledged.

Claims 22 and 29 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 12/03/03.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 18-21 and 23-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Pavate et al. (PN 6,32,819).

With regard to claim 18, Pavate et al. discloses, as shown in Figure 2, a semiconductor device comprising:

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a silicon substrate (110) [Col. 5, lines 44-52];

a patterned dielectric layer (204) on the substrate;

a metal layer (210) on the dielectric layer, the metal layer comprising a first metal and a second metal, wherein the second metal is present in an amount sufficient to increase the hardness of the metal layer [Col. 6, lines 8-16 and 56-65. Note that it is inherent that the metal layer doped with alloy elements will cause precipitation or a phase change in the metal layer].

With regard to claim 19, Pavate et al. discloses the second metal is a solute that improves the hardness of the metal layer [Col. 6, lines 56-65].

With regard to claim 20, Pavate et al. discloses the second metal is beryllium [Col. 3, lines 66-67 and Col. 6, line 14].

With regard to claim 21, Pavate et al. discloses the first metal is copper [Col. 3, lines 64-65 and Col. 6, lines 8-13].

With regard to claim 23, it is inherent that the first metal (copper) has a crystalline lattice and being doped with the second metal (beryllium), atoms of the second metal occupy interstitial sites in the crystal lattice [Col. 3, lines 63-67 and Col. 6, lines 8-16].

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With regard to claims 24 and 28, it is inherent that the metal layer is doped with the second metal (beryllium) will cause precipitations so that the second metal is present in the metal layer as large grained precipitate islands [Col. 3, lines 63-67 and Col. 6, lines 8-16].

With regard to claims 25 and 27, Pavate et al. discloses the doped material is uniformly mixing in a molten copper material, therefore, it is inherent that the second metal is a finely dispersed solute rich phase[Col. 3, lines 63-67, Col. 4, lines 1-9, and Col. 6, lines 8-16].

With regard to claim 26, Pavate et al. discloses, as shown in Figure 2, a semiconductor device comprising:

- a silicon substrate (110) [Col. 5, lines 44-52];
- a patterned dielectric layer (204) on the substrate;
- a metal layer (210) comprising copper and beryllium [Col. 3, lines 63-67 and Col. 6, lines 8-16].

3. Claims 18-21 and 26 are rejected under 35 U.S.C. 102(e) as being anticipated by Edelstein et al. (PN 6,181,012).

With regard to claim 18, Edelstein et al. discloses, as shown in Figure 2, a semiconductor device comprising:

- a silicon substrate (52) [Col. 6, lines 53-55];
- a patterned dielectric layer (no label or 100) on the substrate;

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a metal layer (76 or 78) on the dielectric layer, the metal layer comprising a first metal and a second metal [Col. 4, lines 29-40 and Col. 6, lines 29-33. Note that it is inherent that the metal layer doped with alloy elements will cause precipitation or a phase change in the metal layer and to increase the hardness of the metal layer].

With regard to claim 19, it is inherent that the second metal is a solute that improves the hardness of the metal layer [Col. 4, lines 29-40 and Col. 6, lines 29-33].

With regard to claim 20, Edelstein et al. discloses the second metal is beryllium [Col. 4, lines 29-40 and Col. 6, lines 29-33].

With regard to claim 21, Edelstein et al. discloses the first metal is copper [Col. 4, lines 29-40 and Col. 6, lines 29-33].

With regard to claim 26, Edelstein et al. discloses, as shown in Figure 2, a semiconductor device comprising:

- a silicon substrate (52) [Col. 6, lines 53-55];

- a patterned dielectric layer (no label or 100) on the substrate;

- a metal layer (76 or 78) comprising copper and beryllium [Col. 4, lines 29-40 and Col. 6, lines 29-33].

***Response to Arguments***

4. Applicant's arguments with respect to claims 18 and 26 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (571) 272-1666. The examiner can normally be reached on Mon-Thurs 6:00-3:30, alternate Friday 7:00-3:30, Eastern Time.

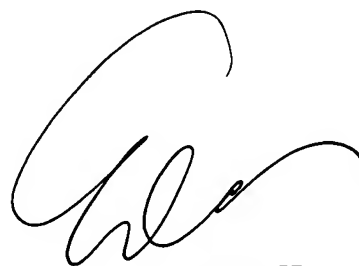
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (571) 272-1732. The Central Fax Number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

February 19, 2004

A handwritten signature in black ink, appearing to be 'Eddie Lee', with a large, sweeping initial 'E' and a stylized 'L'.

EDDIE LEE  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800